

**U.S. Nuclear Regulatory Commission  
Site-Specific  
Written Examination**

**Applicant Information**

Name:	Region: IV
Date:	Facility/Unit: DCP/ Units 1 & 2
License Level: SRO	Reactor Type: W
Start Time:	Finish Time:

**Instructions**

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours after the examination starts.

**Applicant Certification**

All work done on this examination is my own. I have neither given nor received aid.

\_\_\_\_\_  
Applicant's Signature

**Results**

Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

## APPENDIX E POLICIES AND GUIDELINES FOR TAKING NRC EXAMINATIONS

Each examinee shall be briefed on the policies and guidelines applicable to the examination category (written and/or operating test) being administered. The applicants may be briefed individually or as a group. Facility licensees are encouraged to distribute a copy of this appendix to every examinee before the examinations begin. All items apply to both initial and requalification examinations, except as noted.

### PART A - GENERAL GUIDELINES

1. ***[Read Verbatim]*** Cheating on any part of the examination will result in a denial of your application and/or action against your license.
2. If you have any questions concerning the administration of any part of the examination, do not hesitate asking them before starting that part of the test.
4. SRO applicants will be tested at the level of responsibility of the senior licensed shift position (i.e., shift supervisor, senior shift supervisor, or whatever the title of the position may be).
5. You must pass every part of the examination to receive a license or to continue performing license duties. Applicants for an SRO-upgrade license may require remedial training in order to continue their RO duties if the examination reveals deficiencies in the required knowledge and abilities.
6. The NRC examiner is not allowed to reveal the results of any part of the examination until they have been reviewed and approved by NRC management. Grades provided by the facility licensee are preliminary until approved by the NRC. You will be informed of the official examination results about 30 days after all the examinations are complete.

### PART B - WRITTEN EXAMINATION GUIDELINES

1. ***[Read Verbatim]*** After you complete the examination, sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination.
2. To pass the examination, you must achieve a grade of 80.00 percent or greater; grades will not be rounded up to achieve a passing score. Every question is worth one point.
3. For an initial examination, the time limit for completing the examination is five hours.

For a requalification examination, the time limit for completing both sections of the examination is three hours. If both sections are administered in the simulator during a single three-hour period, you may return to a section of the examination that was already completed or retain both sections of the examination until the allotted time has expired.

4. You may bring pens, pencils, and calculators into the examination room. Use black ink to ensure legible copies; dark pencil should be used only if necessary to facilitate machine grading.
5. Print your name in the blank provided on the examination cover sheet and the answer sheet. You may be asked to provide the examiner with some form of positive identification.
6. Mark your answers on the answer sheet provided and do not leave any question blank. Use only the paper provided and do not write on the back side of the pages. If you are using ink and decide to change your original answer, draw a single line through the error, enter the desired answer, and initial the change.
7. If you have any questions concerning the intent or the initial conditions of a question, do *not* hesitate asking them before answering the question. Ask questions of the NRC examiner or the designated facility instructor *only*. When answering a question, do *not* make assumptions regarding conditions that are not specified in the question unless they occur as a consequence of other conditions that are stated in the question. For example, you should not assume that any alarm has activated unless the question so states or the alarm is expected to activate as a result of the conditions that are stated in the question.
8. Restroom trips are permitted, but only one applicant at a time will be allowed to leave. Avoid all contact with anyone outside the examination room to eliminate even the appearance or possibility of cheating.
9. When you complete the examination, assemble a package including the examination questions, examination aids, answer sheets, and scrap paper and give it to the NRC examiner or proctor. Remember to sign the statement on the examination cover sheet indicating that the work is your own and that you have neither given nor received assistance in completing the examination. The scrap paper will be disposed of immediately after the examination.
10. After you have turned in your examination, leave the examination area as defined by the proctor or NRC examiner. If you are found in this area while the examination is still in progress, your license may be denied or revoked.
11. Do you have any questions?

# ANSWER SHEET FOR SENIOR REACTOR OPERATOR WRITTEN EXAMINATION

Multiple Choice (Circle or X your choice)

NAME: \_\_\_\_\_

If you change your answer, write your selection in the blank and initial.

001	A	B	C	D	_____	026	A	B	C	D	_____
002	A	B	C	D	_____	027	A	B	C	D	_____
003	A	B	C	D	_____	028	A	B	C	D	_____
004	A	B	C	D	_____	029	A	B	C	D	_____
005	A	B	C	D	_____	030	A	B	C	D	_____
006	A	B	C	D	_____	031	A	B	C	D	_____
007	A	B	C	D	_____	032	A	B	C	D	_____
008	A	B	C	D	_____	033	A	B	C	D	_____
009	A	B	C	D	_____	034	A	B	C	D	_____
010	A	B	C	D	_____	035	A	B	C	D	_____
011	A	B	C	D	_____	036	A	B	C	D	_____
012	A	B	C	D	_____	037	A	B	C	D	_____
013	A	B	C	D	_____	038	A	B	C	D	_____
014	A	B	C	D	_____	039	A	B	C	D	_____
015	A	B	C	D	_____	040	A	B	C	D	_____
016	A	B	C	D	_____	041	A	B	C	D	_____
017	A	B	C	D	_____	042	A	B	C	D	_____
018	A	B	C	D	_____	043	A	B	C	D	_____
019	A	B	C	D	_____	044	A	B	C	D	_____
020	A	B	C	D	_____	045	A	B	C	D	_____
021	A	B	C	D	_____	046	A	B	C	D	_____
022	A	B	C	D	_____	047	A	B	C	D	_____
023	A	B	C	D	_____	048	A	B	C	D	_____
024	A	B	C	D	_____	049	A	B	C	D	_____
025	A	B	C	D	_____	050	A	B	C	D	_____

# ANSWER SHEET FOR SENIOR REACTOR OPERATOR WRITTEN EXAMINATION

Multiple Choice (Circle or X your choice)

NAME: \_\_\_\_\_

If you change your answer, write your selection in the blank and initial.

051	A	B	C	D	_____	076	A	B	C	D	_____
052	A	B	C	D	_____	077	A	B	C	D	_____
053	A	B	C	D	_____	078	A	B	C	D	_____
054	A	B	C	D	_____	079	A	B	C	D	_____
055	A	B	C	D	_____	080	A	B	C	D	_____
056	A	B	C	D	_____	081	A	B	C	D	_____
057	A	B	C	D	_____	082	A	B	C	D	_____
058	A	B	C	D	_____	083	A	B	C	D	_____
059	A	B	C	D	_____	084	A	B	C	D	_____
060	A	B	C	D	_____	085	A	B	C	D	_____
061	A	B	C	D	_____	086	A	B	C	D	_____
062	A	B	C	D	_____	087	A	B	C	D	_____
063	A	B	C	D	_____	088	A	B	C	D	_____
064	A	B	C	D	_____	089	A	B	C	D	_____
065	A	B	C	D	_____	090	A	B	C	D	_____
066	A	B	C	D	_____	091	A	B	C	D	_____
067	A	B	C	D	_____	092	A	B	C	D	_____
068	A	B	C	D	_____	093	A	B	C	D	_____
069	A	B	C	D	_____	094	A	B	C	D	_____
070	A	B	C	D	_____	095	A	B	C	D	_____
071	A	B	C	D	_____	096	A	B	C	D	_____
072	A	B	C	D	_____	097	A	B	C	D	_____
073	A	B	C	D	_____	098	A	B	C	D	_____
074	A	B	C	D	_____	099	A	B	C	D	_____
075	A	B	C	D	_____	100	A	B	C	D	_____

1

Due to a loss of all secondary heat sink FR-H.1, "Loss of Secondary Heat Sink," has been implemented. The conditions for establishing Bleed and Feed currently exist. SI has been actuated and a feed path verified. In an attempt to establish a bleed path, only one pressurizer PORV can be opened.

What action is required?

- A. Go to FR-C.1, "Response to Inadequate Core Cooling."
- B. Open the reactor vessel head vents (and depressurize at least one SG.)
- C. Go to FR Z.1, "Response to High Containment Pressure."
- D. Reduce SI flow.

2

A reactor trip and SI have occurred as a result of a large break LOCA. E-1.3, "Transfer to Cold Leg Recirculation," has just been completed.

The STA reports the following conditions associated with the Containment critical safety function:

- Containment pressure 2.0 PSIG
- Containment sump level 98 ft
- Containment radiation 1400 R/Hr

Which of the following is an immediate containment concern?

- A. Containment structural integrity.
- B. Erroneous instrumentation readings.
- C. Inadequate suction to the RHR pumps.
- D. Flooding vital equipment in containment.

3

A small break LOCA has occurred and E-1.2, "Post LOCA Cooldown and Depressurization," is in progress.

The following plant conditions exist:

- RCS pressure is 1500 psig
- All 4 RCPs are running
- PZR level is 5%
- Letdown is NOT in service

The crew is ready to commence step 13, "Depressurize RCS to Refill PZR." What impact will performing this step have on the plant?

- A. Safety Injection flow will INCREASE.
- B. Aux spray  $\Delta T$  may be exceeded.
- C. PRT pressure, level and temperature will INCREASE.
- D. Voids in the RCS may collapse.

4

A large break LOCA has occurred. ECA-1.1, "Loss of Emergency Coolant Recirculation," was entered from E-1, "Loss of Reactor or Secondary Coolant," when it was noted that BOTH Residual Heat Removal (RHR) pumps could NOT be started. While the crew is performing ECA-1.1, Step 11, "Establish One Train of SI Flow," power is restored to RHR pump 1-1.

What action should be taken next?

- A. Continue ECA-1.1, Step 11, "Establish One Train of SI Flow."
- B. Return to E-1, Step 11.a, "Verify Cold Leg Recirculation capability."
- C. Go to E-1.3, "Transfer to Cold Leg Recirculation."
- D. Return to ECA-1.1, Step 1, "TRY to Restore Emergency Coolant Recirculation Equipment."

5

An ATWS has occurred, and the crew has progressed to Step 7 of FR-S.1, Response to Nuclear Power Generation / ATWS, when a safety injection occurs.

What action(s) should be taken?

- A. Verify Steps 1 to 11 of E-0, Reactor Trip or Safety Injection.
- B. Implement E-0, Reactor Trip or Safety Injection.
- C. Continue in FR-S.1, and do NOT implement SI actions.
- D. Restart the MDAFW pumps.

6

A reactor trip and safety injection have just occurred from 100% power, and E-0, "Reactor Trip or Safety Injection," has been entered. When DRPI indications are checked, two rods indicate FULLY WITHDRAWN and all other rods indicate FULLY INSERTED.

With current plant conditions, what action(s), if any, should be performed in response to the control rods while in E-0?

- A. Go to EP FR-S.1, "Response to Nuclear Power Generation/ATWS."
- B. Implement AP-6, "Emergency Boration."
- C. No additional actions are required.
- D. Implement STP R-19, "Shutdown Margin Calculation."



Technical Maintenance causes a spurious reactor trip from 100% power. SI has NOT actuated and is NOT required. E-0, "Reactor trip or Safety Injection," has been performed, and transition to the next appropriate procedure has been made. The following conditions currently exist:

- Tavg is 531°F and DECREASING
- All steam dumps are CLOSED
- MSRs are RESET
- Narrow Range levels in all S/Gs are 8% and STABLE
- Total AFW flow has been throttled to 200 GPM to maintain S/G levels at 8%
- S/G pressures are 950 psig and DECREASING slowly
- MSIVs have been closed by the operators

What action should be performed?

- A. Initiate emergency boration.
- B. Manually actuate Safety Injection.
- C. Raise TOTAL AFW flow to at least 435 GPM.
- D. Adjust 10 % dump setpoint to current SG pressure.

A loss of all vital AC power has occurred. The operators are currently depressurizing intact steam generators to reduce RCS pressure to inject the accumulators per ECA-0.0, "Loss of All Vital AC Power."

The following conditions exist:

- o Containment pressure is 4 psig and INCREASING
- o AFW flow is 220 gpm per S/G from the TDAFP
- o S/G NR levels are as follows: 1-1 & 1-4 are 14%; 1-2 & 1-3 are 10%
- o All S/G NR levels are DECREASING slowly
- o Pzr level is 8% and DECREASING rapidly
- o RCS pressure is 1450 psig and DECREASING rapidly

Based on the above conditions, the operators should:

- A. Continue depressurization at MAXIMUM rate while maintaining MAXIMUM AFW flow to ALL S/Gs.
- B. Stop depressurization until greater than 16% NR level is restored in at least ONE S/G.
- C. Stop depressurization until pressurizer level is greater than 36%.
- D. Continue depressurization at REDUCED rate while maintaining MAXIMUM AFW flow to ALL S/Gs.

9

Unit 1 Component Cooling Water System has the following configuration:

- CCW Pump 1-1 operating
- CCW Heat Exchanger 1-1 in service
- CCW Pump 1-3 operating
- CCW Heat Exchanger 1-2 Outlet Valve FCV 431 tagged out for repair of motor operator
- CCW Pump 1-2 tagged out for pump seal repair

What is the maximum time the plant can operate with this configuration before power reduction is required (assuming the above conditions just occurred)?

- A. 1 hour.
- B. 6 hours.
- C. 24 hours.
- D. 72 hours.

10

For a main steamline break, which of the following would most challenge the reactor shutdown margin, assuming the shutdown margin was at its minimum acceptable value for that condition?

- A. EOL, with the reactor at 100% power.
- B. BOL, with the reactor at 100% power.
- C. EOL, with Tavg at 200°F (Mode 5).
- D. EOL, with the reactor at hot zero power.

You are performing ECA-0.0, "Loss of All Vital AC Power," Step 16, "Depressurize Intact S/Gs to Reduce RCS Pressure to Inject Accumulators."

The following conditions currently exist:

- Max rate SG depressurization is in progress
- All S/G pressures are 265 PSIG
- All S/G NR levels are 7%
- All RCS cold leg temperatures are 220°F
- Containment pressure is 2.5 PSIG

Based on the above conditions, you should:

- A. continue depressurization to 240 PSIG in the S/Gs; accumulator water will be injected, but NOT nitrogen.
- B. stop depressurization; a secondary heat sink concern exists.
- C. stop depressurization; a PTS concern exists.
- D. continue depressurization; pressurizer level is NOT a concern.

A SGTR has occurred.

The following conditions exist:

- RCPs were secured due to RCP Trip Criteria
- Ruptured S/G has been IDENTIFIED and ISOLATED
- RCS cooldown to target temperature is COMPLETE
- RCS depressurization is COMPLETE
- Normal charging and letdown are IN SERVICE
- Pressurizer Level is 35%
- RVLIS Upper Range is 100%
- RCS Subcooling (YI-31) is 43 °F
- Ruptured S/G level is 56% NR and STABLE

What action(s) is(are) required regarding RCP status?

- A. Do NOT implement "APPENDIX B" to attempt RCP restart until pressurizer level has been increased to greater than 57%.
- B. Start one RCP, if "APPENDIX B" conditions are met.
- C. Start all RCPs that meet "APPENDIX-B" conditions for start.
- D. An RCP can NOT be started, manually close the Pzr spray valves and verify Natural Circulation.

Because of a Control Room Evacuation, Hot Standby is being established from outside the control room in accordance with OP AP-8A. 4KV vital busses F, G and H are noted to be DE-ENERGIZED.

The correct response is to:

- A. Refer to Appendix B, and go to ECA-0.0.
- B. Verify Appendix B is in progress, and refer to ECA-0.0.
- C. Refer to Appendix B, while continuing with AP-8A.
- D. Go to ECA-0.0, and refer to OP AP-8A.

Due to a problem with kelp at the Intake Structure, Condenser pressure has deteriorated to 4.2" Hg. absolute. Turbine load has been reduced to 300 MWe. Conditions have been stable for 5 minutes. Considering the foldout page for OP AP-7, the operating crew should take the following actions:

- A. Reduce load as necessary to restore Condenser pressure to less than 3.5" Hg. absolute
- B. Trip the reactor
- C. Valve in additional air ejectors
- D. Raise turbine load to a value greater than 30%

15

What is the significance of not allowing RVLIS to fall below 76% full range when performing a natural circulation cooldown with voids in the reactor vessel head?

- A. Ensures that upper head voiding does not result in the upper range RVLIS from reading off scale low.
- B. Ensures that voids don't enter the hot leg and be swept to the SG U-tubes where they could inhibit natural circulation flow.
- C. Ensures that excessive upper head voiding does not cause the Pzr level to go solid.
- D. Ensures that the voids don't enter the cold legs where they could enter the reactor causing hot spots in the core.

16

During a loss of all vital AC event, the safeguards loads are isolated from the vital busses.

How are the Containment Fan Cooling Units (CFCUs) prevented from starting and loading when a vital bus is eventually energized?

- A. Control power fuses are pulled.
- B. Control switches are placed in stop.
- C. CFCU breakers are locally opened.
- D. DC control power switches are opened.

17

The Auxiliary Feedwater Pumps are supplying the steam generators following a reactor trip. The Condensate Storage Tank level decreases to 10% and an alternate source of feedwater to the Auxiliary Feedwater System is necessary.

Which list has the sources of water in the preferred order of use?

- A. Condensate Storage Tank from Condenser Hotwell,  
Makeup Water Transfer Tank,  
Raw Water Reservoir,  
Fire Water Storage Tank
- B. Raw Water Reservoir,  
Fire Water Storage Tank,  
Condensate Storage Tank from Condenser Hotwell,  
Makeup Water Transfer Tank
- C. Fire Water Storage Tank,  
Condensate Storage Tank from Condenser Hotwell,  
Makeup Water Transfer Tank,  
Raw Water Reservoir
- D. Raw Water Reservoir,  
Condensate Storage Tank from Condenser Hotwell,  
Fire Water Storage Tank,  
Makeup Water Transfer Tank

18

Steam Trap 104 on the Turbine Driven Auxiliary Feed Pump (TDAFP) is isolated due to excessive steam trap blow-by.

What action is required to maintain the TDAFP OPERABLE?

- A. Open the trap Bypass Isolation Valve.
- B. Check the remaining steam trap drain lines for condensate removal flow at least once per shift.
- C. Open the upstream drain valve every eight hours to ensure adequate condensate removal.
- D. Run the TDAFP at least once every eight hours to ensure adequate condensate removal.



19

Main Feed Pump 1-1 does NOT trip after a loss of vital DC bus 1-2. Why is it necessary to run the pump speed to minimum with the Lovejoy controller and then locally trip the pump?

- A. To prevent overpressurizing the main condenser.
- B. To prevent running the pump without lubricating oil.
- C. To prevent overspeeding the pump.
- D. To prevent overpressurizing the pump discharge.

20

Unit 1 is currently in Mode 3, Hot Standby, when Steam Generator Level Channel LT-527 is determined to be INOPERABLE. A Power increase to Mode 2 is currently in progress.

What action(s), if any, should be taken?

- A. The channel must be placed in the tripped condition within 1 hour for the startup to proceed.
- B. The channel must be placed in the tripped condition within 6 hours, and startup to Mode 2 can continue.
- C. A mode change from Mode 3 to Mode 2 can NOT be performed until the channel is restored to operable status.
- D. NO action is required until Mode 2 is achieved.

21

In addition to a Phase A isolation, when a SIS is initiated, the following CVCS pumps and valves will:

- A. Both centrifugal pumps start and SI-8803A/B close.
- B. Both centrifugal and the PDP pumps start and SI-8805A/B open.
- C. Both centrifugal pumps start and LCV-112B/C close.
- D. Both centrifugal and the PDP pumps start and CVCS 8107/8108 close.

22

A Loss of Coolant Accident results in the operators transitioning from E-0 to E-1, "Loss of Reactor or Secondary Coolant." The following conditions exist:

- Containment Pressure is 7 psig
- RCS Pressure is 1290 psig
- RCS Temperature is 540 F
- All ECCS pumps are running

What is the basis for stopping all RCPs based on these conditions?

- A. The RCPs are NOT designed to operate during adverse containment conditions.
- B. To reduce the heat input to the RCS from the RCPs during the loss of coolant accident.
- C. The continued operation of RCPs during certain SBLOCA events would cause deeper and longer core uncover.
- D. Operation of the RCPs with 2 phase flow will damage the RCPs because of excessive vibration.

23

Following a steamline break and Containment Spray actuation, containment pressure is 24 psig and containment radiation levels are normal.

Which of the following actions should be performed?

- A. Reset the containment spray signal and then secure the containment spray pumps and shut the spray additive tank outlet valves.
- B. Allow containment pressure to decrease below 20 psig and then reset containment spray, stop both spray pumps, shut the containment spray header stop valves, and shut the spray additive tank outlet valves.
- C. Allow containment pressure to decrease below 20 psig and then reset the containment spray signal after the spray time of two hours is met.
- D. Transition to FR-Z.1, "Response to High Containment Pressure".

24

The cold leg accumulator isolation valves (8808's) are:

- A. containment isolation valves and de-energized while at 100% power.
- B. containment isolation valves and fail closed on loss of power.
- C. NOT containment isolation valves and fail open on loss of power.
- D. NOT containment isolation valves and de-energized while at 100% power.

25

Reactor startup is in progress. Reactor power is 15%. Power range channel NI41 fails downscale.

IDENTIFY the response to this failure.

- A. If power were increased to 20%, C-1 would fail to operate due to one of its inputs failed downscale.
- B. Intermediate range trips would be reinstated, if previously blocked, due to the downscale failure of the power range.
- C. Intermediate range trips would be able to be blocked even with the failed power range.
- D. If not blocked, the trip at 25% power would fail to operate due to the failed instrument.

26

Which ONE of the following is the speed droop setting on the governor, and reason for that setting for an EDG running in automatic and supplying power to its vital bus?

- A. Set at MINIMUM to enable the EDG to change load without changing speed.
- B. Set at MINIMUM to enable the EDG to increase speed as load increases.
- C. Set at MAXIMUM to enable the EDG to change load without changing speed.
- D. Set at MAXIMUM to enable the EDG to increase speed as load increases.

27

Reactor power is 100%. Pressurizer pressure instruments are as follows:

- PT 455 supplying PCV 455C
- PT 456 supplying PCV 456 and PCV 474

PT 456 fails high with pressurizer pressure at 2235 psig. With no operator action and all systems in normal operating configuration, the SEQUENCE of events that will occur is:

- A. PCV 456 and 474 opens, block valves close, proportional heaters full on, and backup heaters on.
- B. Proportional heaters full on, backup heaters on, PCV 456 and PCV 474 opens.
- C. PCV 456 and PCV 474 opens, proportional heaters full on, backup heaters on.
- D. PCV 455C and PCV 474 opens, proportional heaters full on, backup heaters on.

28

The following SEQUENTIAL events have just occurred:

- charging flow decreased to minimum,
- pressurizer level decreased,
- letdown isolated and heaters turned off,
- pressurizer level increased to high level reactor trip.

Pressurizer level control selector switch is in the LT-459 position and pressure control is on PT-455. No operator actions have been taken. Which failure has occurred?

- A. Reference pressurizer level failed to the no load position.
- B. Auctioneered Tavg failed Hi due to a failed RTD.
- C. Level channel 459 failed high.
- D. Level channel 459 failed low.

29

Which ONE of the following is the reason for the INITIAL S/G swell as power INCREASES?

- A. INCREASES due to bubble formation and an INCREASE in S/G downcomer mass.
- B. INCREASES due to bubble formation and a DECREASE in S/G downcomer mass.
- C. INCREASES due to INCREASED S/G pressure and an INCREASE in S/G downcomer mass.
- D. INCREASES due to INCREASED S/G pressure and a DECREASE in S/G downcomer mass.

30

Which ONE of the following describes the effect that a vital inverter failure will have on vital (safety related) instrument power?

- A. No loss of power since vital instrument power is automatically backed up from 120 VAC source.
- B. No loss of power since vital instrument power will be automatically supplied from the batteries if an inverter fails.
- C. Momentary loss of power until vital instrument power is automatically re-energized from 480 VAC via regulated transformers.
- D. A loss of power until vital instrument power can be manually re-energized from 480 VAC via regulated transformers.

31

Given the following:

RCS pressure is 225 psig.

RCS temperature is 200 degrees F.

RHR Heat Exchanger Flow control valve (HCV-638) is 10% open.

ONLY RHR train "A" is in operation.

Which ONE of the following describes the expected operator actions when a CCW SURGE TANK HI alarm on PK01-07 annunciates?

- A RHR Heat Exchanger flow control valve (HCV-638) will be OPENED to maintain desired RHR system flow rate and PZR Level maintained by increasing charging flow.
- B RHR Heat Exchanger bypass valve (HCV-670) will be CLOSED to bypass RHR Heat Exchanger and Train "B" placed in service.
- C RHR Heat Exchanger flow control valve (HCV-638) will be CLOSED and RHR pump recirculation flow control valve fully OPENED.
- D RHR Heat Exchanger flow control valve (HCV-638) will be CLOSED and HCV-133 to CVCS Letdown CLOSED.

32

The following Plant conditions exist:

MODE 1 with reactor power at 9%.

Tavg at 560 degrees F.

Steam Dumps in AUTOMATIC in STEAM PRESSURE mode.

Which ONE of the following statements describes the plant response if (PT- 507) fails HIGH?

- A. Steam dumps remain closed because the arming signal is absent since the difference between reactor and turbine power is 3%.
- B. Steam dumps open with arming signal present since the steam header pressure is greater than the controller setpoint.
- C. Steam dumps open with arming signal present since Tavg-Tref has greater than a 2 degree difference.
- D. Steam dumps remain closed because the arming signal is absent since Tavg is less than the LOW Tavg setpoint.

33

The 1-1 and 1-2 Component Cooling Water (CCW) pumps are operating when an SI signal is received. Normal power is available.

IDENTIFY the response of the CCW system to this condition.

- A. The 1-1 and 1-2 CCW pumps will trip and restart. The 1-3 CCW pump will remain off.
- B. The 1-3 CCW pump will start and excess letdown CCW valve, FCV-361, will close.
- C. The 1-1 and 1-2 CCW pumps will trip. The 1-3 CCW pump will start.
- D. The 1-1 and 1-2 CCW pumps will continue to run. In addition the 1-3 CCW pump will start and excess letdown CCW valve, FCV-361, will stroke full open.

34

During the performance of the abnormal procedure to realign a Dropped Rod, the Pulse to Analog converter was mistakenly NOT held in "Manual". Later, the rods are driven in during a rapid power decrease.

What is the consequence of this mistake?

- A. Failure of rod bank LoLo limit alarm to come in when required.
- B. A Non-Urgent failure alarm occurs on inward rod motion.
- C. A disparity between bank demand and DRPI indication.
- D. An indicated misalignment between rods in the affected group.



35

Which ONE of the following parameters is monitored to ensure the Heat Flux HCF, FQ(Z) limit is maintained within its limits?

- A. Quadrant Power Tilt Ratio.
- B. DNB parameters.
- C. RCS flow rate.
- D. Axial Flux Difference.

36

Given the following:

- The plant is in MODE 5 and has been shutdown 22 days.
- One (1) train of RHR is tagged out and one (1) train is supplying RCS cooling flow, with RCS level maintained at the hot leg centerline
- The S/G primary side manways are open in preparation for nozzle dam installation.
- RCS Temperature is 120 degrees F
- Pressurizer Temperature is 140 degrees F

Using Appendix B to OP AP SD-5, "Loss of Residual Heat Removal", which ONE of the following is the MINIMUM estimated time for the RCS to reach 200 degrees F if RHR flow is lost?

- A. 23.0 minutes.
- B. 25.6 minutes.
- C. 26.2 minutes.
- D. 34.1 minutes.

A reactor trip AND safety injection occur. The operators perform the Immediate Actions of E-0, "REACTOR TRIP OR SAFETY INJECTION," with the following indications:

- Reactor trip breakers are OPEN
- Rod H-2 stuck at 228 steps (DRPI)
- Turbine governor and stop valves are CLOSED
- Electrical buses F, G, H are ENERGIZED
- Containment pressure is 5 psig
- Feed water isolation valves are CLOSED
- Phase A Light Box shows many WHITE LIGHTS ON

What action should the operators take next?

- A. Manually actuate Phase A Containment Isolation.
- B. Check that PK02-02, "SAFETY INJECTION INITIATE," is ON.
- C. Verify Containment Vent Isolation.
- D. Perform Emergency Boration per OP AP-6.

A reactor trip has occurred from 100% power. During performance of E-0, "Reactor Trip or Safety Injection," immediate actions, it is observed that the Main Turbine Stop and Governor valves are all OPEN.

What is the concern if this condition is NOT corrected?

- A. A rapid increase in PZR pressure.
- B. A rapid increase in RCS cold leg temperatures.
- C. Possible damage to the main turbine.
- D. An uncontrolled cooldown of the RCS.

The following plant conditions exist:

Rod Control Urgent Failure Alarm	LIT
General Warning LED for rod F-2	LIT
Rod Bottom LED for rod F-2	LIT
Rods in	MANUAL

Which ONE of the following confirms the existence of a dropped rod?

- A. The Tavg chart recorder shows an increasing trend from 572 F
- B. The power range NI's increased to 101% from 99%.
- C. The QPTR is 1.004 as compared to the last calculation of 1.005.
- D. The Tavg chart recorder shows a decreasing trend from 572 F.

A Liquid Radwaste Discharge Permit and Checklist have been completed in accordance with OP G-1 in preparation for overboard discharge of an Equipment Drain Receiver. Checklist status is as follows:

- One Circulating Water Pump is RUNNING
- One Aux Saltwater Pump is RUNNING
- RE-18, Radwaste Effluent Radiation Monitor, is OOS
- FR-20, Radwaste Effluent Recorder, is OOS

Based on the information given, should the Shift Foreman authorize the discharge?

- A. YES; the alternate radiation monitor and flow recorder could be used.
- B. YES; samples can be analyzed and flow rate can be estimated.
- C. NO; there is insufficient dilution flow.
- D. NO; both the discharge radiation monitor and the flow recorder are out of service.

41

Unit 1 shutdown recently and is in Mode 5 when a loss of all AC occurs. Operators take proper action to start decay heat removal using steam generators. While performing this task the operators are asked to allow the RCS pressure to INCREASE.

What is the purpose of allowing the RCS to repressurize?

- A. Enhance the natural circulation of the RCS.
- B. Enable the operators to control RWST gravity flow into the RCS.
- C. Prevent exceeding the maximum makeup capabilities of the rapid drain system to the steam generators.
- D. Provide the proper D/P across the RCP seals in anticipation of restarting the RCPs.

42

Given the following:

- o The crew is responding to a large break LOCA.
- o A CORE COOLING status tree MAGENTA path causes a transition to FR-C.2, "Response to Degraded Core Cooling."
- o During performance of FR-C.2, the CORE COOLING status tree changes from MAGENTA to YELLOW.
- o A MAGENTA path exists on the CONTAINMENT status tree.
- o FR-Z.1, "Response to High CTMT Pressure," is the procedure referenced by the CONTAINMENT status tree.

Which ONE of the following is the required action?

- A. Complete FR-C.2 and then go to FR-Z.1, since CONTAINMENT is a lower priority path than CORE COOLING.
- B. Go to FR-Z.1, since a MAGENTA path has higher priority than a YELLOW path. Completion of FR-C.2 is not needed.
- C. Complete FR-C.2, after completing FR-Z.1, since the CORE COOLING status tree had been in a MAGENTA path.
- D. Perform FR-C.2 and FR-Z.1 together, since FR procedures of the same priority can be executed together.

43

Which ONE of the following describes the procedure method of controlling Tavg - Tref mismatch while a dropped rod RETRIEVAL is in progress during at-power operations?

- A. Combination of rod bank movement and dilution/boration.
- B. Adjust the Main Turbine load as necessary.
- C. Moving other rods in another bank.
- D. Borating as necessary.

44

The containment atmosphere radiation monitors RM-44A AND RM-44B sample:

- A. containment atmosphere utilizing gaseous effluent and isolate the containment purge system upon a S signal.
- B. atmosphere inside the containment for the Hydrogen Control System and are not isolated by auto phase A actuation.
- C. atmosphere between the containment isolation valves on the mini-purge exhaust line and can initiate a CVI actuation.
- D. atmosphere from the containment purge exhaust line outside containment and can initiate a CVI actuation.

45

The trip of a running Circulating Water Pump at 100% power will:

- A. cause a turbine trip on low vacuum.
- B. require a load reduction to < 50%.
- C. have no effect because the other pump has enough capacity.
- D. cause reactor power to increase due to condenser efficiency decreasing.

46

Which ONE of the following describes the use of adverse containment values in the advent of a LOCA?

- A. If containment pressure or radiation exceeds the stated value on the foldout page, adverse containment values are used for the duration of the event.
- B. Once in adverse conditions normal values can be used, if both pressure and radiation decrease less than the foldout page values.
- C. Once in adverse conditions, a return to normal values can be made, if containment pressure was the only reason adverse conditions had been declared.
- D. Once in adverse conditions, a return to normal values can be made, if containment radiation was the only reason adverse conditions had been declared.

47

Which ONE of the following is the maximum allowable dose at the site boundary that should be received by a person following an inadvertent release from a Gas Decay tank?

- A. A whole body dose of 0.002 rem
- B. A thyroid dose of 0.27 rem
- C. A thyroid dose of 0.017 rem
- D. A whole body dose of 0.5 rem

48

Which ONE of the following are symptoms of BOTH a steamline break inside containment and a LOCA that require the transition from E-0, "Reactor Trip or Safety Injection," to E-1, "Loss of Reactor or Secondary Coolant"?

- A. High containment radiation.  
High containment pressure.  
Increasing containment recirculation sump level.
- B. Low RCS pressure.  
High containment pressure.  
Increasing containment recirculation sump level.
- C. Low RCS pressure.  
Low pressurizer level.  
Increasing containment recirculation sump level.
- D. Low RCS pressure.  
Low pressurizer level.  
High AFW flow.

49

Which ONE of the following air operated valves inside containment fails closed on a loss of instrument air?

- A. RCP "1" seal water outlet valve (8141A).
- B. Reactor vessel flange leakoff valve (8032).
- C. Regenerative heat exchanger to loop 4 cold leg (8146).
- D. Pressurizer Relief Tank to Reactor Coolant Drain Tank (8031).

50

The following plant conditions exist:

-Reactor trip/ SI actuated	
-RCS Temperature	500 degrees F
-pressurizer pressure	2000 psig
-steam generator (1,2,3) pressure	450 psig
-steam generator level 1,2,3	50% wide range
-steam generator 4 pressure	0 PSIG
-steam generator level 4	5% wide range
-auxiliary feedwater flow	200 GPM to each SG
-containment pressure	10 psig

Which ONE of the following actions should be taken with the auxiliary feedwater system? (ASSUME MSIVs ARE SHUT)

- A. Reduce flow on all steam generators until 4350 GPM total flow is achieved.
- B. Isolate auxiliary feedwater flow to steam generator 4 to minimize containment pressure and maintain greater than 435 GPM to the other 3 intact SGs.
- C. Maintain 25 GPM to steam generator 4 to avoid dryout and maintain the other 3 intact SGs at 6% level.
- D. Isolate auxiliary feedwater flow to steam generator 4 and reduce flow to less than 435 GPM to the other 3 intact SGs.



The unit is in the process of ramping to full power at 10% per hour with the following conditions:

- NIS power 80%
- Turbine load 960 MWE
- Tavg 580 degrees F
- Pressurizer pressure 2205 psig

Which ONE of the following describes plant status with respect to Technical Specification's limitations?

- A. Pressure is less than the required DNB value; no action is required, since cause is due to the power ramp.
- B. Pressure is less than the required DNB value; the required action is to restore temperature to within the specified limits or reduce thermal power.
- C. Pressure is above the required DNB value; no action is required.
- D. Pressure is less than the required DNB value; the required action is to restore pressure to within the specified limits or reduce thermal power.

The following plant conditions exist:

- The reactor is in Mode 1.
- A steam generator tube leak has been identified in S/G 1-2 per OP AP-3, "Steam Generator Tube Leak".
- Steam Generator pressure in the "1-2" generator has remained less than 1035 psig.
- Prior to the shutdown the plant experienced a loss of ALL site power and the Immediate Action steps of ECA-0.0, "Loss of All AC Power have been completed.
- Health Physics has just found indications of a radioactive release to the environment.
- Prior to the loss of AC power ALL components were in their normal Mode 1 configuration.

Which ONE of the following components/systems is the radiation release point to the environment?

- A. Steam generator blowdown.
- B. Turbine Driven Auxiliary Feedwater Turbine.
- C. Steam generator sample lines.
- D. Steam Safety relief valves.

53

The following plant conditions exist:

- The reactor has been tripped due to a Steam Generator Tube Rupture.
- The Reactor Coolant Pumps are OFF.
- E-3, "Steam Generator Tube Rupture", step 23 (depressurization of the RCS using PZR PORV) is being performed.
- RCS pressure is 825 psig.
- Pressurizer level is zero (0)%.

Which ONE of the following is the cause for the pressurizer level indication to return on scale during depressurization?

- A. Accumulators have injected into the core.
- B. RCS has reached saturation and the upper portion of the core has voided.
- C. Non-condensable gases have formed in the reactor vessel.
- D. The open PORV has reduced RCS pressure sufficiently to allow ECCS water to match break flow.

54

CCP 1-1 is in service when CVCS-HCV-142 drifts to the CLOSED position resulting in a loss of normal charging.

Which ONE of the following is the required action?

- A. Fully open FCV-128 to maximize charging flow.
- B. Start an idle charging pump.
- C. Open CVCS-8387B, FCV-128 bypass
- D. Open CVCS-8403, seal control bypass valve.

The following plant conditions exist:

- Reactor startup in progress.
- SRNI N31 reads  $2E4$  cps.
- SRNI N32 reads  $1.7E4$  cps.
- Both IRNIs read  $4E-11$  amps.
- SUR is 0 dpm.
- Control Bank D is at 62 steps.

Which ONE of the following describes the technical specification required action if N32 channel suddenly fails to ZERO when Control Bank D is again withdrawn?

- A. Continue the startup using N31 as the valid channel/instrument.
- B. Stop rod withdrawal; place N31 Level Trip in BYPASS and continue the startup using the IRNI.
- C. Suspend all positive reactivity additions until the N32 channel has been repaired.
- D. Insert all control banks; recommence the startup after the N32 channel has been repaired.

Pressurizer PORV 456 has lifted and failed to fully reseal resulting in the following plant conditions: (assume no other automatic actions)

- Rx trip
- pressurizer pressure 1985 psig
- pressurizer vapor space temperature 635 degrees
- Tavg 557 degrees
- PRT level 75 %
- PRT pressure 35 psig

The tailpipe temperature indication for Pressurizer PORVS should read:

- A. full scale high at 400 degrees F.
- B. 280 degrees F.
- C. 260 degrees F.
- D. 220 degrees F.

57

Which ONE of the following is the basis for stopping the RCPs upon entering FR-H.1, "Response to Loss of Secondary Heat Sink"?

- A. Allows the operator time to establish a higher flow rate for high pressure SI thus increasing the RCS cooldown rate.
- B. Allows for a more controlled cooldown via natural circulation when feedwater is established.
- C. Allows the operator time to depressurize the intact steam generators in order to reduce RCS pressure and inject the accumulators.
- D. Allows the operator to reduce heat addition to the RCS and extend the inventory in the steam generators.

58

During a refueling operation with a fuel assembly near the transfer cart in transit from the Reactor Vessel to the Containment Building Upender, a HIGH RADIATION alarm, PK11-21 is received. Radiation Monitor RE-7, Incore Seal Table Area Monitor, is reading 57 mR/hr.

To place the fuel assembly in a "Safe Position," the fuel assembly should be:

- A. Placed in the upender, and upender lowered.
- B. Lowered in the refueling mast, gripper engaged, to the Refueling Pool floor.
- C. Taken back to the reactor vessel.
- D. Left as is.

E-0.2, "Natural Circulation Cooldown," step 15e, "Start Depressurization using Aux Spray or one PZR PORV and Continue Cooldown," is in progress. As pressure decreases, a large increase in pressurizer level occurs. Charging and letdown are in manual and approximately equal. The procedurally required operator response is to:

- A. isolate the ECCS accumulators to stop the level increase.
- B. increase the cooldown rate up to the maximum permitted rate of 50°F/hr to return pressurizer level to normal.
- C. minimize charging flow while maintaining letdown in service to return pressurizer level to normal.
- D. repressurize the RCS within the limits of the cooldown curve to return pressurizer level to normal.

A LOCA and loss of offsite power occur. The diesel generators start and energize all the safeguard buses.

The operators have just completed E-0, "REACTOR TRIP OR SAFETY INJECTION," and are about to enter E-1, "LOSS OF REACTOR OR SECONDARY COOLANT," but the CSF Status Tree data listed below is currently on display:

- RVLIS Train A	Out of Service
- RVLIS Train B Full Range	70%
- RVLIS Dynamic Range	18%
- RCS Pressure	1900 psig
- All Core Exit Thermocouples	800 °F
- AFW flow to S/G 1-1	115 gpm
- AFW flow to S/G 1-2	125 gpm
- AFW flow to S/G 1-3	145 gpm
- AFW flow to S/G 1-4	135 gpm
- Containment Pressure	24 psig
- Containment Radiation	1850 R/HR

Based on the above indications the operators should go to:

- A. FR-Z.1, "RESPONSE TO CONTAINMENT HIGH PRESSURE."
- B. FR-C.2, "RESPONSE TO DEGRADED CORE COOLING."
- C. FR-Z.3, "RESPONSE TO CONTAINMENT HIGH RADIATION."
- D. FR-C.1, "RESPONSE TO INADEQUATE CORE COOLING."

Due to a reactor trip and subsequent loss of offsite power, procedure E-0.4, "Natural Circulation Cooldown with Steam Void in Vessel (without RVLIS)," step 8, is in progress. During depressurization to the target pressure, PZR level rapidly increases to 92%.

What action(s) should the operators take?

- A. Stop RCS depressurization, then energize pressurizer heaters to increase RCS pressure by 100 psig.
- B. Stop RCS depressurization, then isolate accumulators if RCS pressure is less than 1000 psig.
- C. Continue RCS depressurization until RCS pressure is within 50 psig of the average pressure of all SGs.
- D. Continue RCS depressurization until RCS pressure is less than 900 psig, then isolate accumulators.

The following plant conditions exist:

- The controlling pressurizer level channel fails low.
- No operator action is taken.

Which ONE of the following sets of parameters describes the affect of this failure on the plant?

- A. Normal letdown remains in service, reactor partial trip occurs, and charging flow increases.
- B. Normal letdown isolates, charging flow increases, and reactor trip occurs.
- C. Normal letdown remains in service, reactor trip occurs, and charging flow decreases.
- D. Normal letdown isolates, reactor trip occurs, charging flow decreases.

63

Which ONE of the following will AUTOMATICALLY terminate a Liquid Radwaste release?

- A RE-18 source check.
- B RE-18 placed in "LEVEL CAL".
- C High liquid radwaste discharge flow rate.
- D Low dilution water flow rate.

64

A LOCA has occurred, core exit thermocouple temperatures are indicating 690°F and rapidly increasing.

Which ONE of the following is the expected response of the core exit thermocouples if core exit temperature continues to increase. ASSUME NO CORE COOLING IS PRESENT.

- A. The incore thermocouples will indicate lower than actual temperature as temperature core exit exceeds 700 degrees F.
- B. The incore thermocouples will indicate lower than actual temperature as core exit temperature exceeds 1200 degrees F.
- C. The incore thermocouples will become more accurate above 700°F and provide satisfactory indication up to about 1200°F.
- D. The incore thermocouples will become less accurate above 700°F and provide satisfactory indication up to about 2300°F.



65

Which ONE of the following actions is correct concerning Letdown Temperature Diversion valve, TCV-149?

- A. It will divert to the VCT if letdown flow temperature from the letdown Hx increases to 136 °F.
- B. It will divert flow from the VCT to the demineralizers on a high VCT level.
- C. It will divert letdown to a LHUT if letdown flow temperature increases to 136 °F.
- D. It will divert to the demineralizers on a loss of control air.

66

Which ONE of the following is the basis for allowing two (2) hours to reduce the QUADRANT POWER TILT RATIO (QPTR) to within its limit with a tilt condition of greater than 1.02 but less than 1.09?

- A. Allows corrective action in the event of a xenon redistribution following power changes.
- B. Allows identification and repositioning of a dropped or misaligned rod.
- C. Allows boron concentration changes to restore QPTR to less than 1.02.
- D. Allows for identification and correction of a failed excore detector.

67

An operator is attempting to reset the throttle trip valve for AFW pump 1-1 following an overspeed trip. He has turned the handwheel for FCV-152 fully clockwise, but the latching lever will not stay latched. What is the next action?

- A. Verify that the overspeed trip mechanism is properly reset. If necessary, you must pull UP on the threaded stud of the latch plate until it locks into position.
- B. Verify that the overspeed trip mechanism is properly reset. If necessary, press DOWN on the threaded stud of the latch plate is fully seated.
- C. The operator must bleed the oil pressure off of the governor by turning the adjustment knob to the MINIMUM position. This knob must then be returned to the MAXIMUM position.
- D. The operator must bleed the oil pressure off of the governor by turning the adjustment knob ONE full turn. This knob must then be returned to its ORIGINAL position.

68

The following plant conditions exist:

- The reactor has tripped.
- Safety Injection has actuated.
- The immediate actions of E-0, "Reactor Trip or Safety Injection", have been completed.

Which ONE of the following represents the reason for an abnormal system status indication on the SI portion of monitor light box C?

- A. Containment fan cooler running in fast speed.
- B. Containment fan cooler running in slow speed.
- C. Containment fan cooler switch in the fast speed position.
- D. Containment fan cooler switch in the slow speed position.

69

A reactor trip and SI have occurred five minutes ago and the following conditions exist:

MSIVs 1, 3, and 4 are shut.  
1-1 S/G pressure is 1005 psig.  
1-2 S/G pressure is 850 psig.  
1-3 S/G pressure is 975 psig.  
1-4 S/G pressure is 1005 psig.

Where is the turbine driven aux feed pump getting its motive steam?

- A Steam line 3 down stream of MSIV
- B Steam lines 1 and 4 upstream of MSIV
- C Steam lines 2 and 3 upstream of MSIVs
- D Steam line 3 upstream of MSIV

70

Which ONE of the following manipulator crane interlocks prevents motion of the bridge AND trolley when the tube is not at the upper limit and the gripper is disengaged?

- A. Slack cable interlock.
- B. Gripper UP safety interlock.
- C. Tube UP interlock.
- D. Slow zone interlock.

71

A natural circulation cooldown is in progress per E-0.2, "Natural Circulation Cooldown."

The following parameters currently exist:

- 12 KV power is now available
- RCP seal differential pressures are 1000 psid
- 1-1, 1-3, & 1-4 RCP seal leakoff flows are 0.2 gpm
- 1-2 RCP seal leakoff flow is 0.4 gpm
- RCS hot leg temperatures are 410°F
- PZR level is 20%
- S/G 1-1, 1-2, 1-3, 1-4 narrow range levels are 33%
- CST level is 9%

Which of the following actions should be performed?

- A. Go to OP L-5, "Plant Cooldown from Minimum Load to Cold Shutdown."
- B. Actuate safety injection and go to E-0, "Reactor Trip or Safety Injection."
- C. Restart RCP 1-2 per Appendix B.
- D. Implement OP D-1:V, "Alternate AFW Supplies."

72

What action must be taken upon a COMPLETE LOSS of Emergency Diesel Generator (EDG) Room fire protection, assuming its associated fire doors are functional?

- A. Establish a fire watch patrol in the area within one hour.
- B. Establish a continuous fire watch with backup fire suppression equipment in the affected area within one hour.
- C. Declare the EDG inoperable and restore to OPERABLE status within 7 days or be in Hot Standby within the next 6 hours.
- D. Declare the EDG inoperable and restore to OPERABLE status within 72 hours or be in Hot Standby within the next 6 hours.

73

Operators are responding to a LOCA outside of containment and have entered ECA-1.1, "LOSS OF EMERGENCY COOLANT RECIRCULATION." Per procedure, the SFM directs the operator to establish only one train of SI flow to the core.

The basis for establishing one train of SI instead of both trains is:

- A. To prevent overfilling the pressurizer which may cause RCS overpressurization.
- B. To prepare for further RCS depressurization and cooldown.
- C. To guard against damaging all SI.
- D. To extend the time before RWST inventory is depleted.

74

A reactor trip and safety injection occur while operating at 22% power. The operators have just completed the Immediate Actions of E-0, "REACTOR TRIP OR SAFETY INJECTION."

The following conditions exist:

- S/G levels are 39% NR and STABLE
- S/G pressures are 950 psig and STABLE
- WR RCS pressure is 1820 psig and INCREASING
- SCMM reads 60°F and is INCREASING
- Pressurizer PORVs are CLOSED
- Pressurizer level is 56% and STABLE
- Secondary Radiation is NORMAL with NO monitors in ALARM
- Containment pressure is 0.1 psig and stable
- Containment radiation is NORMAL with NO monitors in ALARM
- Containment WR, structure, and cavity sump levels are NORMAL

Based on these conditions, what procedure will be performed after E-0?

- A. E-2, "FAULTED STEAM GENERATOR ISOLATION."
- B. E-1, "LOSS OF REACTOR OR SECONDARY COOLANT."
- C. E-0.1, "REACTOR TRIP RESPONSE."
- D. E-1.1, "SI TERMINATION."

75

You are on watch in the control room as a licensed operator. Shifts are 12 hours long. All the shifts are manned to the minimum composition of OP1.DC12, "Conduct of Routine Operations." Your watch relief is NOT on site for shift turnover.

Which ONE (1) of the following describes the guidance of the above instruction in this situation?

- A. Shift composition may NOT drop below the minimum unless an operator exceeds 12 hours on watch. Turnover your watch station to the oncoming unit Shift Foreman and depart.
- B. Shift composition may be one less than the minimum while attempting to contact the absent individual. Turnover your watchstation to the oncoming unit Shift Foreman and attempt to contact the absent individual.
- C. Shift composition may NOT be one less than the minimum as a result of an oncoming watchstander being absent. Remain on watch.
- D. Shift composition may be one less than the minimum for two hours. Turnover your watchstation to the oncoming unit Shift Foreman but remain on site in standby.

76

Given the following:

- Unit 2 is at 100% power.
- A minor excursion of 2% reactor power has just occurred.

Which ONE (1) of the following is the MAXIMUM time in which to reduce reactor power to within limits?

- A. Within five (5) minutes.
- B. Within 15 minutes.
- C. Within 30 minutes.
- D. There is NO time limit provided the eight-hour power average is NOT exceeded.

77

Which ONE of the following reflects the condition and the bases for Technical Specification 3.5.3 "Emergency Core Cooling Systems", requirement that ALL Safety Injection Pumps be verified INOPERABLE?

- A In Mode 4 to ensure that a mass addition transient can be relieved by one PORV.
- B In Mode 5 with water above the reactor vessel flange to ensure that a mass addition transient can be relieved by one pressurizer safety valve.
- C In Mode 5 with water below the reactor vessel flange to ensure that a mass addition transient can be relieved by one RHR suction relief valve.
- D In Mode 6 with the reactor vessel head removed and core alterations in progress in the vicinity of the reactor vessel hot legs.

78

Given the following:

A twenty five (25) year old Maintenance Contractor with complete exposure records has the following exposure record for the current calendar year:

- Shallow Dose Equivalent 2.55 REM
- Committed Dose Equivalent 0.75 REM
- Deep Dose Equivalent 2.13 REM
- Lens Dose Equivalent 3.08 REM
- Committed Effective Dose Equivalent 1.95 REM

Which ONE of the following is the individual's Total Dose Equivalent (TEDE) for the current calendar year?

- A. 2.88 REM
- B. 4.08 REM
- C. 5.21 REM
- D. 5.43 REM

Given the following:

- Unit 1 is at 100% power
- On-line risk assessment is being performed.

Which ONE of the following situations would REQUIRE Operations Director approval prior to removing equipment from service for maintenance? AD7.DC6,"On-line Maintenance Risk Assessment," Attachment 9.13 is attached.

- A. YELLOW termini are present on the COMPONENT COOLING and CONTAINMENT Key Safety Functions are green.
- B. The scheduled duration of work is less than the PRA Allotted Outage Time.
- C. YELLOW termini are present on the HEAT SINK and RCS INTEGRITY Key Safety Functions, while all other Key Safety Functions are green.
- D. The PRA Allotted Outage Time is less than the threshold PRA Allotted Outage Time.

Which ONE of the following responsibilities may be delegated by the Interim Site Emergency Coordinator (ISEC)?

- A. Approval of emergency dose limits necessary to save a life.
- B. Classification of an emergency event.
- C. Notification of the Nuclear Regulatory Commission.
- D. Assignment of plant personnel to positions in the Site Emergency Organization.



81

Given the following:

- An earthquake of magnitude 0.04g was detected on Unit 1 at 1400.

Which ONE of the following is the LATEST time the fire area (zones) must be inspected for possible undetected earthquake induced fires?

- A. 1500
- B. 1600
- C. 1700
- D. 1800

82

Which ONE of the following tasks can the Work Control Shift Foreman authorize with verbal concurrence of a Unit Shift Foreman?

- A. Performance of STP R-1A, "Exercising Full Length Control Rods"
- B. Performance of STP M-21C, "Main Turbine Valve Testing"
- C. Remove DG 1-2 from service for Governor replacement.
- D. Placement of CVCS Deborating Demin 1-2 in service.

Unit 1 DFWCS backup power supply needs replacement. A formal communication has been written to allow the MFW Regulation Valves and MFW pump controllers to be placed in manual for the duration of the replacement.

Which ONE of the following should be prepared and attached to the formal communication before work is allowed to begin.

- A. Licensing Basis Impact Evaluation (LBIE).
- B. Operability Evaluation (OE).
- C. Licensing Basis Impact Evaluation (LBIE) Screen.
- D. Prompt Operability Assessment (POA)

Unit 1 is in Mode 5 with the following electrical equipment status:

- Startup Power is cleared for Transformer work.
- Aux. Power and Crosstie capability is operable.
- Diesel Generator 1-1 is cleared.
- Diesel Generator 1-2 & 1-3 are operable.

Using the attached reference(s) determine which ONE (1) of the following situations is required to allow Maintenance to place Diesel Generator 1-3 on its backup DC power source.

- A. After IY 13 is made available
- B. After Diesel Generator 1-1 is made available
- C. After Mode 6 transition
- D. After water level in reactor cavity greater than 23 Feet

85

An area in the Auxiliary Building has the following conditions:

Dose Rate      10 mrem/hr

Airborne        I-131      1.5 DAC

Surface Contamination 800 dpm/100 cm<sup>2</sup> gamma

Which ONE of the following is the correct posting for this area?

- A.      Radiation Area only.
- B.      Surface Contamination Area and Airborne Radioactivity
- C.      Airborne Radioactivity Area only.
- D.      Radiation Area and Airborne Radioactivity Area.

86

Which ONE of the following is the basis for reducing Tavg to less than 500 deg. F. when the specific activity of the RCS is greater than 100/E microCuries per gram of gross radioactivity?

- A.      Elimination of CRUD bursts.
- B.      Elimination of the iodine spiking phenomenon.
- C.      Allows faster cleanup by the CVCS Mixed Bed Demineralizer
- D.      Prevents a release of activity in the event of a steam generator tube rupture.

87

A radwaste release is in progress, High Radiation alarm PK11-21 annunciator actuates.

Which ONE of the following lists the required action?

- A. Verify FCV-477 closes and check PPC (plant process computer) to validate the alarm per approved release permit.
- B. Notify Radwaste and verify RCV-18 is open.
- C. Check process monitors, then verify RCV-18 is closed and FCV-477 is open.
- D. Check process monitors, then verify RCV-18 is open and FCV-477 is closed.

88

Step 14 of FR-C.1, "Response To Inadequate Core Cooling" directs the operator to stop all RCPs prior to depressurizing all intact SGs from 140 psig to atmospheric pressure.

Which ONE of the following is the reason for this action?

- A Remove RCP heat load from RCS
- B Ensure core exit thermocouple temperature will be reduced
- C Ensure RCP number 1 seal integrity
- D Enhance natural circulation cooling of the reactor core

Which of the following radiation monitor(s) isolates the steam generator blowdown outside containment valves AND closes the isolation valves of the steam generator blowdown sample system?

- A. RM-19 or RM-23
- B. RM-22.
- C. RM 17A or 17B.
- D. RM-48

A LOCA has occurred. In response to a RED path on the CORE COOLING Critical Safety Function Status Tree, FR-C.1, "Response to Inadequate Core Cooling," is currently in progress.

Containment hydrogen concentration is 4.1%.

What action should be performed with the hydrogen recombiners, and why?

- A. Operate the hydrogen recombiner system to reduce the hydrogen concentration.
- B. Operate the hydrogen recombiners after receiving additional guidance from engineering.
- C. Do NOT operate the hydrogen recombiners since they could result in ignition of the hydrogen.
- D. Do NOT operate the hydrogen recombiners since the hydrogen recombiner system will not be effective at this concentration.

91

A Nuclear Engineer calculates core thermal power using a heat balance, but neglects the effects of RCP horsepower and of S/G blowdown being in service.

Which of the following best describes how this will effect the calculated value versus actual thermal power?

- A Both effects make the calculated value higher.
- B Neglecting RCPs makes the calculated value higher, neglecting blowdown makes it lower.
- C Neglecting RCPs makes the calculated value lower, neglecting blowdown makes it higher.
- D Both effects make the calculated value lower.

92

Which ONE of the following conditions would prevent the Motor Driven AFW pumps from being secured following automatic actuation?

- A. AMSAC signal reset
- B. Both Main Feedwater Pumps relatched (reset).
- C. 12kV bus undervoltage
- D. Indicated Steam Generator level in 3 of the 4 SG's above the lo-lo level setpoint.

93

The plant has experienced a large break LOCA. SI, Phase B, and CTMT Spray have actuated. When should the Containment Spray Pump suction be transferred to the RHR Cold Leg from sump Recirculation?

- A. RWST level Lo alarm and a lo-lo spray additive tank level.
- B. RWST Level Lo Lo alarm and containment pressure greater than 22 psig.
- C. A lo-lo spray additive tank level alarm and containment pressure greater than 22 psig.
- D. RWST level Lo alarm and containment pressure greater than 22 psig.

94

Select the ONE (1) statement which describes the Flow Control Valves for the Motor Driven Auxiliary Feedwater Pumps.

- A. The valves are electrohydraulically operated and provide automatic runout protection of the MDAFW pumps.
- B. The valves are motor operated and throttle close automatically at high flow rates to limit containment pressure increase caused by a steam line rupture in containment.
- C. The valves are air operated and throttle close automatically at high flow rates to prevent pump cavitation.
- D. The valves are electrohydraulically operated and throttle close automatically on a loss of hydraulic pressure.

A loss of the unit 1 TD AFW will result DIRECTLY from a loss of which of the following 125 VDC buses?

- A. 1-1
- B. 1-2
- C. 1-3
- D. PD-15

IDENTIFY the minimum elevation allowed in the fuel pool to ensure adequate water level above fuel during fuel movements.

- A. 110 Ft
- B. 115 Ft
- C. 124 Ft
- D. 137 Ft



97

Which ONE of the following describes the design volume and the rupture disk design pressure of the Pressurizer Relief Tank (PRT)?

- A. 1800 cubic feet and 100 psig.
- B. 2000 cubic feet and 110 psig.
- C. 2400 cubic feet and 120 psig.
- D. 2800 cubic feet and 140 psig.

98

The plant is operating at 100% steady state conditions. At 1200 hours on September 5th, chemistry reports the following RCS DOSE EQUIVALENT I-131 sample results for the past 4 hours:

- 0800	0.05 microcuries/gram
- 0900	0.045 microcuries/gram
- 1000	1.2 microcuries/gram
- 1100	75.0 microcuries/gram

What action is required to be taken?

- A. Restore the Dose Equivalent I-131 within the limits by 1000 Sept 7th, or be in HOT STANDBY by 1600 on Sept 7th.
- B. Be in at least HOT STANDBY with  $T_{avg}$  less than 500°F by 1600.
- C. Be in at least HOT STANDBY with  $T_{avg}$  less than 500°F by 1700.
- D. Restore the Dose Equivalent I-131 within the limits by 1100 on Sept 7th, or be in HOT STANDBY by 1700 on Sept 7<sup>th</sup>.

Which ONE of the following instrument failures will result in an uncontrolled control rod group withdrawal accident if rod control is in automatic?

- A. Turbine first stage pressure fails low.
- B. Auctioneered T-Hot fails high.
- C. Auctioneered T-Avg fails low.
- D. Power range channel N-43 fails high.

While observing the containment purge radiation monitor (RM44A) radiation display unit (RDU), you notice that the HIGH ALARM and CVI BYP status lights on the panel are both on.

Based solely on the indications at the RDU, which of the following is true regarding the containment purge CVI status?

- A. A CVI signal has been sensed and a CVI has occurred.
- B. The status is normal; high radiation on R-44A will cause a CVI.
- C. A CVI signal is sensed, but the CVI function is bypassed and it will not occur.
- D. A CVI has not been sensed, but CVI actions will occur when it is sensed.

# ANSWER KEY FOR SENIOR REACTOR OPERATOR WRITTEN EXAMINATION

001	A	<u>B</u>	C	D	_____	026	<u>A</u>	B	C	D	_____
002	A	B	C	<u>D</u>	_____	027	A	B	<u>C</u>	D	_____
003	<u>A</u>	B	C	D	_____	028	A	B	<u>C</u>	D	_____
004	A	B	C	<u>D</u>	_____	029	<u>A</u>	B	C	D	_____
005	<u>A</u>	B	C	D	_____	030	<u>A</u>	B	C	D	_____
006	A	B	<u>C</u>	D	_____	031	A	B	C	<u>D</u>	_____
007	<u>A</u>	B	C	D	_____	032	A	<u>B</u>	C	D	_____
008	A	<u>B</u>	C	D	_____	033	A	<u>B</u>	C	D	_____
009	A	B	C	<u>D</u>	_____	034	<u>A</u>	B	C	D	_____
010	A	B	C	<u>D</u>	_____	035	A	B	C	<u>D</u>	_____
011	A	B	<u>C</u>	D	_____	036	<u>A</u>	B	C	D	_____
012	A	<u>B</u>	C	D	_____	037	<u>A</u>	B	C	D	_____
013	A	<u>B</u>	C	D	_____	038	A	B	C	<u>D</u>	_____
014	A	<u>B</u>	C	D	_____	039	A	B	C	<u>D</u>	_____
015	A	<u>B</u>	C	D	_____	040	A	<u>B</u>	C	D	_____
016	A	B	<u>C</u>	D	_____	041	<u>A</u>	B	C	D	_____
017	A	<u>B</u>	C	D	_____	042	<u>A</u>	B	C	D	_____
018	<u>A</u>	B	C	D	_____	043	A	<u>B</u>	C	D	_____
019	A	B	C	<u>D</u>	_____	044	A	B	C	<u>D</u>	_____
020	A	<u>B</u>	C	D	_____	045	A	<u>B</u>	C	D	_____
021	A	B	<u>C</u>	D	_____	046	A	B	<u>C</u>	D	_____
022	A	B	<u>C</u>	D	_____	047	A	B	C	<u>D</u>	_____
023	A	<u>B</u>	C	D	_____	048	<u>A</u>	B	C	D	_____
024	A	B	C	<u>D</u>	_____	049	A	B	C	<u>D</u>	_____
025	A	B	<u>C</u>	D	_____	050	A	<u>B</u>	C	D	_____

# ANSWER KEY FOR SENIOR REACTOR OPERATOR WRITTEN EXAMINATION

051	A	B	<u>C</u>	D	_____	076	A	<u>B</u>	C	D	_____
052	A	<u>B</u>	C	D	_____	077	<u>A</u>	B	C	D	_____
053	A	<u>B</u>	C	D	_____	078	A	<u>B</u>	C	D	_____
054	A	B	C	<u>D</u>	_____	079	A	B	C	<u>D</u>	_____
055	A	B	<u>C</u>	D	_____	080	A	B	<u>C</u>	D	_____
056	A	<u>B</u>	C	D	_____	081	A	<u>B</u>	C	D	_____
057	A	B	C	<u>D</u>	_____	082	A	B	<u>C</u>	D	_____
058	<u>A</u>	B	C	D	_____	083	A	B	<u>C</u>	D	_____
059	A	B	C	<u>D</u>	_____	084	A	B	C	<u>D</u>	_____
060	A	<u>B</u>	C	D	_____	085	A	B	C	<u>D</u>	_____
061	<u>A</u>	B	C	D	_____	086	A	B	C	<u>D</u>	_____
062	A	<u>B</u>	C	D	_____	087	A	B	<u>C</u>	D	_____
063	A	<u>B</u>	C	D	_____	088	A	B	<u>C</u>	D	_____
064	A	B	C	<u>D</u>	_____	089	<u>A</u>	B	C	D	_____
065	<u>A</u>	B	C	D	_____	090	A	B	<u>C</u>	D	_____
066	A	<u>B</u>	C	D	_____	091	<u>A</u>	B	C	D	_____
067	A	<u>B</u>	C	D	_____	092	A	B	C	<u>D</u>	_____
068	<u>A</u>	B	C	D	_____	093	A	<u>B</u>	C	D	_____
069	A	B	C	<u>D</u>	_____	094	<u>A</u>	B	C	D	_____
070	A	B	<u>C</u>	D	_____	095	A	<u>B</u>	C	D	_____
071	A	B	C	<u>D</u>	_____	096	A	B	C	<u>D</u>	_____
072	A	<u>B</u>	C	D	_____	097	<u>A</u>	B	C	D	_____
073	A	B	C	<u>D</u>	_____	098	A	B	<u>C</u>	D	_____
074	A	B	C	<u>D</u>	_____	099	A	B	<u>C</u>	D	_____
075	A	B	<u>C</u>	D	_____	100	A	B	<u>C</u>	D	_____

